

Claims

1. Computer network for the configuration, installation, monitoring, error diagnosis and/or error analysis of plural technical-physical processes, in particular electric drive processes, which run under the control, regulation and/or monitoring by plural process computer nodes 4, which are connected via at least one shared communication system to at least one diagnosis computer node in which one or more configuration, monitoring, diagnosis service(s) and/or function(s) are implemented, which are allocated to the processes and/or the process computer nodes 4 and/or to the data processing operations running therein, characterised in that the shared communication system is realised by the Ethernet or another bus or communication system operating asynchronously and/or with a stochastic access method.
2. Network according to claim 1, characterised in that a communication unit or computer node is interconnected between the Ethernet or other bus or communication system and at least one of the process computer nodes 4 and connects the process computer node 4 to the Ethernet or other bus or communication system.
3. Network according to claim 2, characterised in that the communication unit or communication computer node 5 is formed for enquiry-based or event-based communication with the diagnosis computer node.
4. Network according to claim 2 or 3, characterised in that the communication unit or communication computer node 5 is formed for communication with the diagnosis computer node via XML protocols and/or as an XML-based interface.

5. Network according to one of claims 2 to 4, characterised in that the communication unit is capable of running entirely or in part on the hardware of the process computer node and/or diagnosis computer node.
6. Network according to one of claims 2 to 4, characterised in that the communication computer node 5 is formed as an additional component for the respective process computer node 4.
7. Network according to one of claims 2 to 5, characterised in that for each data exchange each communication unit is allocated a process computer node 4 and/or a technical-physical process or each communication computer node 5 is allocated at least one technical-physical process or a process computer node 4.
8. Network according to one of claims 2 to 5 or according to claim 7, characterised in that at least one of the communication computer nodes 5 is connected to plural process computer nodes preferably via a serial communication system.
9. Network according to one of claims 2 to 8, characterised in that the communication unit or communication computer node 5 is provided with functionalities for an error search or diagnosis in the region of at least one of the process computer nodes and/or technical physical processes.
10. Network according to one of the preceding claims, characterised in that the diagnosis computer node is formed for delivering or supporting web-based operating surfaces in particular via data remote transmission or a long-distance traffic network and is provided with the function components corresponding to the operating surfaces.

11. Network according to one of the preceding claims, characterised by a structure corresponding to the client/server architecture with the diagnosis computer node as server.
12. Diagnosis computer node for a network according to claim 11 and optionally 2, formed as a server with interfaces to at least one database, for communication with the communication and/or process computer nodes and other client computer nodes, wherein the one or more interfaces to the other client computer nodes are formed as Servlet containers, which provide transmission of diagnosis data obtainable from the interfaces for communication with the communication and/or process computer nodes to the client nodes, and the one or more interfaces to the communications and/or process computer nodes or communication units are realised on the basis of the Ethernet, characterised by a diagnosis channel, which is formed by the following:
 - with one or more Ethernet interfaces allocated to the communication and/or process computer node 4;
 - with an event management unit with database access, which is formed for processing the diagnosis data obtained at the Ethernet interfaces;
 - with an event monitoring unit applied on the basis of the Servlet container, which makes available output data from the event management unit to one or more Applets on external client computer nodes.
13. Diagnosis computer node according to claim 12, characterised in that a web server for generating and forwarding data obtained from HTML pages by the Servlet container is connected downstream of the Servlet container.
14. Diagnosis computer node according to claim 12 or 13, characterised in that the interfaces are installed for communication with the communication and/or process computer node via XML protocols and/or the interfaces for communication with the client computer nodes via SOAP (Simple Object Process Protocol).

15. Diagnosis computer node according to one of the preceding claims, characterised by a communication unit installed by program or software technology in such a manner that thereby one or more of the process computer nodes 4 can be connected to the Ethernet or other bus communication system.
16. Diagnosis computer node according to one of the preceding claims, characterised by an appliance management unit having information data via the configuration of the technical-physical processes together with associated process computer nodes 4 and one or more function components, which are formed to visualise the configuration in combination with the client computer node and/or for keeping ready the information data for further data processing operations.
17. Communication computer node 5 or communication unit as a software and/or firmware module, each for the network according to one of claims 1 to 11, characterised by a first interface which is allocated to the at least one diagnosis computer node and which is programmed for communication via protocols of the TCP/IP family, including UDP/IP, preferably on the basis of the Ethernet, and by one or more second interfaces allocated to one or more of the process computer nodes 4, wherein the first and the one or more second interfaces may be coupled together via one or more information brokers, which are each formed by program and/or circuit technology as sub-units for bidirectional enquiry-based and/or event-based data communication between the first and second interface(s).
18. Communication computer node 5 or communication unit according to claim 17, characterised in that the first interface is formed for communication on the basis of XML protocols.

19. Communication computer node 5 or communication unit according to claim 17 or 18, characterised in that the second interface is formed for connection to a serial communication system.
20. Communication computer node 5 or communication unit according to one of the preceding claims, characterised in that the one or more information brokers comprise one or more function components, which are formed for error search or diagnosis in the region of the process computer nodes and/or technical-physical processes.
21. Communication computer node 5 or communication unit according to one of the preceding claims, characterised in that plural information brokers are installed with different functionalities and are connected to a connection manager, which is formed by program or circuit technology as a sub-unit for carrying out pre-determinable priority stages, according to which a specified one of the plural information brokers may be connected to the second interface(s) and each have a communication requirement at the process computer node(s) 4.
22. Communication computer node 5 or communication unit according to one of the preceding claims, characterised by a software information broker for bidirectional transmission of firmware or other data or complete data records from the first to the second interface(s).
23. Communication computer node 5 or communication unit according to claim 22, characterised in that an FTP (File Transfer Protocol) server is interconnected between the software information broker and the first interface.
24. Communication computer node 5 or communication unit according to one of the preceding claims, characterised by the provision of a non-volatile

write/read memory, in particular flashcard memory, with which one or more of the information brokers communicate.

25. Communication computer node 5 or communication unit according to one of the preceding claims, characterised by a parameter information broker for realising an interface which is preferably XML-based for the reading and/or writing of parameters in one or more allocated process computer nodes 4.
26. Communication computer node 5 or communication unit according to one of the preceding claims, characterised by an error/event information broker, which is formed for communication with an XML-based protocol on the basis of TCP/IP via the first interface and is provided with a test and trigger member which can be so configured from outside that if a predetermined event occurs, e.g. a tolerance limit is exceeded, in the region of the process computer node(s) 4 and/or of the technical-physical process, automatically a corresponding message transmission is released to the first interface.
27. Communication computer node 5 or communication unit according to one of the preceding claims, characterised by the installation of an interpreter for the running of scripts which are formed for access to function elements and/or information data in the information broker(s) for the purpose of carrying out monitoring and diagnosis functions.
28. Communication computer node 5 or communication unit according to claim 27, characterised in that the interpreter may be so coupled to an FTP (File Transfer Protocol) server connected to the first interface that scripts received via the first interface may be executed.
29. Communication computer node 5 or communication unit according to one of the preceding claims, characterised by being formed as an additional structural component for a respective process computer node 4 and/or structural incorporation with a process computer node.

30. Communication unit according to one of the preceding claims, characterised by implementation which is at least in part loadable on to the hardware of a process and/or diagnosis computer node.

Key to the drawings

Fig. 1

Antriebs... - drive system

Diagnoserechnerknoten – diagnosis computer node

Leitstand – control station

Diagnose – diagnosis

Router od. ISDN/Analog – router or ISDN/analogue

Ferndiagnose – remote diagnosis

Fig. 2

Diagnoserechnerknoten – diagnosis computer node

Diagnosestationen – diagnosis stations

Fig. 3

Prozessrechnerknoten – process computer node

Kommunikationsrechnerknoten – communication computer node

Diagnoserechnerknoten – diagnosis computer node

Konfiguration – configuration

Bedienung – operation

Diagnose – diagnosis

Client-Rechnerknoten – client computer node

Fig. 4

Zur Prozess ...- To the process computer plane

Aufzeichnungs ... - record manager

Anlagenmanager – appliance manager
 Ereignis ... - event manager
 Benutzer ... - user manager
 Logging... - logging manager
 Anlagenübersicht – appliance monitoring
 Logbuch – logbook
 Aufzeichnung – record
 Visualisierung – visualisation
 Inbetriebnahme ... - installation + service
 Wartung – maintenance
 Ereignisanzeige – event display
 Menu – menu
 Menuhandler – menu handler
 SOAP-Handler – SOAP handler
 Zyklische Daten – cyclical data
 Event + Heartbeat – event + heartbeat
 Diagnose-Rechner ... - diagnosis computer node
 Firewall - firewall
 Zu den... - to the client computer node

Fig. 5

Prozess...- process computer node
 Kommunikations ... - communication computer node
 Proprietäres protokoll – proprietary protocol
 Informationsbroker – information broker
 Parameter – parameters
 Fehler U. Events – errors and events
 Bedarfsdaten – demand data
 Zyklische Sollwerte – cyclical setpoint values
 Zeitzynchronisation – time synchronisation
 Telnet-Zugang – Telnet access
 Konfigurations.. – configuration manager

Skripte – script

Logging Server – logging server

Diagnose-Netz – diagnosis network

Diagnose-Rechnerknoten – diagnosis computer node

Steuerungs-Netz – control network

Steuerung – control

Fig. 6

Gesamtübersicht – Total monitoring

Anlagenübersicht – appliance monitoring

(reading down the left-hand column)

Appliance status

Appliance monitoring

Logbook

Diagnosis

Record

Visualisation

Service

Parameter monitor

Maintenance

Regulator administration

Data records

Events

Secure drive

Firmware update

System functions

Settings

User management

BAUDIS NET setup

Documentation

Log off

Fig. 7

Antriebsystem – drive system

Column on left reads same as for Fig. 6

Translator's note

On page 33 there is a reference to a Figure 8 – this does not seem to exist.